



# FORWARD GUIDANCE WITH AN ESCAPE CLAUSE:

WHEN HALF A PROMISE IS BETTER THAN A FULL ONE\*

Maria Lucia Florez–Jimenez

Julian A. Parra–Polania

## Abstract

Using a three-equation New Keynesian model we find that incorporating an escape clause (EC) into Forward Guidance (FG) is welfare improving as it allows the monetary authority to avoid cases in which the cost of reduced flexibility is too high. The EC provides the central bank with another instrument (additional to the promised policy rate), the announced threshold. The greater the size of the recessionary shock the lower the optimal promised rate and the higher the optimal threshold (i.e. the higher the probability of delivering the promised rate). While FG with an EC is better than discretion for facing any zero–lower bound (ZLB) situation, unconditional FG performs better than discretion only in the most extreme 16% of ZLB events. Furthermore, even for very large recessionary shocks it is not optimal to make unconditional promises.

JEL Classification: E47, E52, E58

Keywords: forward guidance, escape clause, zero lower bound, central bank communication

---

\*We are grateful to seminar participants at Banco de la República for their comments. The views expressed here are those of the authors and do not necessarily represent those of Banco de la República or its Board of Directors. This version corrects some errors found in the numerical results of the previous version (March 2014). Some of the conclusions changed. Contact e-mails: mflorez@minhacienda.gov.co and jparrapo@banrep.gov.co.

# 1 Introduction

In recent years most of the major central banks have given, at some point, forward guidance (FG) about the path of policy rates, that is, public statements about the outlook for future policy. Although this may be partially a consequence of the increasing trend of monetary policy transparency, such a practice has also been encouraged by the need to resort to unconventional policies in the wake of the global financial crisis.<sup>1</sup>

As a result of the crisis, some monetary policymakers face a situation in which they are not able or willing to further reduce its conventional instrument (i.e. the short-term nominal interest rate), as it is already close to zero. Under these circumstances, rather than just a transparency mechanism, FG turns into an alternative way to provide additional stimulus to the economy, through the expectations channel.

Following Campbell et al. (2012) one can distinguish between two forms of FG, *Delphic* and *Odyssean*.<sup>2</sup> In the former, the monetary authority makes public its own forecast on the likely path of future policy rates so as to communicate information about the economic outlook. In general, this type of guidance does not imply changes in the way that the central bank reacts to macroeconomic variables (i.e. no changes in the reaction function). In Odyssean FG, rather than merely releasing a forecast, the central bank announces and commits to a policy path and such path communicates a change in the approach to the conduct of policy.

Delphic FG may affect the economy as long as it provides new information to the market or reduces uncertainty about some expected variables; however, it might do it in an unintended direction. If the market perceives from the announcement that the central bank has an unexpected negative view of the future, there will be a negative effect on the current economy as a result of the downward revision in market expectations. Moreover, central bank transparency may lead to a decrease of investment in information (i.e. crowding out of private information), thereby resulting in a reduction of the market's ability to predict monetary policy (Kool et

---

<sup>1</sup>Examples of this practice after the crisis can be seen in the communications of the Fed, since 2008, the Bank of Japan and the Bank of Canada, since 2009, and the Bank of England and the European Central Bank, since 2013.

<sup>2</sup>These names are related to two stories from the Greek mythology. The first one refers to the Oracle of Delphi, where Pythia the priestess used to foretell the future. The second refers to the story of Odysseus (Ulysses) who had his men tie him to the mast in order to escape from the temptation of the Sirens' song.

al., 2011).

In Odyssean FG, as long as there is a credible commitment, the announced path should deliver, via expectations, an effect on the economy in the intended direction: the current economy can be stimulated by promising to keep the policy rate low even after the economy requires a higher rate.

From a theoretical point of view, Eggertsson & Woodford (2003) show that committing to keep the future policy rate low (i.e. Odyssean FG) corresponds to the optimal policy in a lower-bound situation, in the context of a New Keynesian model. Similarly, Gersbach & Volker (2008) provide arguments in favour and against the desirability of both types of FG, Delphic and Odyssean. Levin et al. (2010) show that (Odyssean) FG may be sufficient to mitigate the effects of a shock of moderate size and persistence, but additional policy measures (such as large-scale asset purchases) are required to respond to large and highly persistent shocks.

Empirically, there are mixed results about the effectiveness of FG. This may nevertheless be due to the fact that central bankers have provided FG in rather a Delphic version instead of tying their hands with regard to future policy, as argued by Woodford (2012) and Floro & Tesfaselassie (2013). In other cases guidance may be given in a confusing way such that its effect is harmful rather than useful. If markets interpret an announcement of low future policy rates as a downward revision of the economic outlook rather than as a promise of keeping policy more accommodative than normal, then FG may exacerbate the lower-bound problem.<sup>3</sup>

Using data from New Zealand, Norway, Sweden and the U.S., (Kool & Thornton, 2012) find weak evidence that FG helps to improve market participants' ability to forecast short-

---

<sup>3</sup>In August 2013, during a press conference, the Governor of the Bank of England (BoE) declared that their guidance did not imply a change in the reaction function (Bank of England, 2013b). Furthermore, in recent speeches the Deputy Governor for Monetary Policy of the BoE remarked that their intention was not to pre-commit to a 'lower for longer' policy (Bank of England, 2013c) and one of the members of the Monetary Policy Committee attributed the interest rates' rise to the fact that markets were expecting that the economy would reach 7% unemployment before it was originally expected and stated that "this is rather sooner than I think is likely" (Bank of England, 2013d). These type of statements seemed to communicate that the BoE was not changing its approach to the conduct of policy but had a more negative view on future economy than the market (totally in contradiction to the type of guidance that stimulates the economy).

term yields but no evidence of increased predictability of long-term yields. Gürkaynak et al. (2005) find that not only the current federal funds rate target affects asset prices in the U.S. but also information about the future path of policy does. Campbell et al. (2012) obtain a similar result using a longer data sample. Furthermore, they find that the public imputes Delphic content to policy announcements i.e. FG is perceived as containing news about the economic outlook rather than about changes in the conduct of policy. Quite the opposite, Raskin (2013) and Femia et al. (2013) find evidence that FG leads to a change in the perception of the Federal Open Market Committee’s (FOMC) reaction function.

In practice, it would be difficult to characterise every episode of FG as ‘purely Delphic’ or ‘purely Odyssean’. In theory, Delphic guidance may result more interesting for the economic literature on transparency while Odyssean guidance may be more appealing for the study of alternative monetary-policy tools in a lower-bound situation. This paper belongs to the latter strand of literature and intends to contribute to it by including an escape clause in the formal analysis. We incorporate an element that is becoming common practice in Odyssean guidance, the fact that the monetary authority promises a future policy rate but also announces the special conditions under which it would not deliver such rate.<sup>4</sup> In so doing, we find that including an escape clause in providing FG is welfare improving. An escape clause allows the central bank to avoid cases in which the cost of losing flexibility is too high, that is, cases where fulfilling the initial promise (i.e. keeping the interest rate at a very low level) implies a significant deviation from the optimal policy.

The escape clause provides the central bank with another instrument (additional to the promised policy rate), the announced threshold for the escape clause. The greater the size of the recessionary shock the lower the optimal promised rate and the higher the optimal threshold, and hence the higher the probability of delivering the announced rate. We also find that while FG with an escape clause is better than discretion for facing any zero-lower bound (ZLB) situation, unconditional FG performs better than discretion only in the most

---

<sup>4</sup>Announcing the conditions that might lead to deviations from the promised rate is also known as ‘state-contingent’ guidance as opposed to ‘time-contingent’ guidance, in which the central bank sets a date after which the current policy stance may change. The Fed started providing time-contingent guidance but it currently provides ‘state-contingent’ guidance, as does the Bank of England (Bank of England, 2013a). Previous literature has pointed out that time-contingent guidance may impose high costs on the central bank in terms of flexibility and, for the same reason, may be less credible and effective (Woodford, 2012).

extreme 16% of ZLB events. Furthermore, even for very large recessionary shocks it is not optimal to make unconditional promises.

Our results are obtained under the assumption that the announcement made by the monetary policymaker is fully credible. FG with imperfect credibility has been studied by Bodenstein et al. (2012). They setup a model in which there is no escape clause but at any point in time the central bank has an opportunity to discard its promise and re-optimize with an exogenous probability. In contrast, in our model the probability of reneging on the announced rate is endogenous. The combination of an escape clause and imperfect credibility is left for future research.

The remainder of the paper is as follows. Section two presents the model and briefly describes the credibility problem of FG. Section three introduces an escape clause to the model. Section four concludes.

## 2 FG and the credibility problem

### 2.1 The Model

To study FG we use a two-period model. It consists of a loss function, a New Keynesian Phillips curve and a New Keynesian IS curve. The period loss function is of the following form:

$$L_t = \pi_t^2 + \lambda y_t^2 \tag{1}$$

where  $\pi$  is inflation,  $y$  is the output gap, and  $\lambda$  the relative weight given to output stabilisation.

The Phillips curve and the IS curve are, respectively:

$$\pi_t = \beta E_t \pi_{t+1} + \kappa y_t \tag{2}$$

$$y_t = E_t y_{t+1} - \frac{1}{\delta} (i_t - E_t \pi_{t+1}) + \varepsilon_t \tag{3}$$

where  $E_t$  is the expectations operator conditional on information available at time  $t$ ;  $0 < \beta < 1$  is the discount factor,  $\delta$  and  $\kappa$  are positive constants;  $i_t$  is the nominal interest rate; and  $\varepsilon_t$  is

the demand shock, which we assume is uncorrelated over time. All variables are expressed as deviations from the steady state.

## 2.2 Discretion vs. Forward Guidance

Under discretion, the central bank minimises its loss with respect to  $i_t$ , subject to equations (2) and (3). This is a standard monetary policy problem whose solution for any period  $t$  implies the following expression for the optimal interest rate:<sup>5</sup>

$$i_t^* = \delta \varepsilon_t$$

In turn, this result implies that there is no loss (for this simple model), i.e.,  $L_t = 0$ . However, due to the existence of a lower bound for the nominal interest rate ( $i_t \geq i_l$ ), in rare but possible cases (where large and negative shocks are realised), the central bank is not able to set  $i_t$  at its optimal level (i.e.  $\delta \varepsilon_t < i_l$ ).

To illustrate FG we assume that, in period  $t$ , there is a negative and large demand shock such that the interest-rate lower bound is reached. The economic recovery is expected in  $t+1$ , and hence  $E_t \varepsilon_{t+1} \equiv \bar{\varepsilon}_{t+1} > 0$ .<sup>6</sup> In this case, under discretion,  $L_{t+1}$  is still zero but since  $i_t = i_l$  the loss for period  $t$  is

$$L_t^{DLB} = \frac{\kappa^2 + \lambda}{\delta^2} (i_l - \delta \varepsilon_t)^2 > 0 \quad (4)$$

where the superscript *DLB* indicates that we are referring to the case under discretion with an interest-rate lower bound. As expected, the social loss is increasing in the deviation of the interest rate from its optimal level.

Suppose now that the central bank intends to reduce the loss in period  $t$  by promising a specific value for the interest rate in  $t+1$  ( $\theta_{t+1}$ ), i.e. the monetary authority provides FG.

---

<sup>5</sup>Since there is no commitment and shocks are uncorrelated over time  $E_t y_{t+1}, E_t \pi_{t+1} = 0$ .

<sup>6</sup>This is a simplification related to the fact that we reduce the analysis of the lower-bound problem to a two-period model. In a multiple or infinite period model one could take into account the possibility of facing the lower-bound situation for several periods before the economic recovery. In our two-period setup we eliminate uncertainty about the moment in which recovery occurs (the shock in  $t+1$  is certainly positive) but there is still uncertainty about its strength (the exact value of  $\varepsilon_{t+1}$  is unanticipated).

The central bank announces  $\theta_{t+1}$  so as to minimise  $L_t + \beta E_t L_{t+1}$  subject to equations (2), (3) and  $i_t = i_l$ . The solution to this problem yields

$$\theta_{t+1} = \delta \bar{\varepsilon}_{t+1} - A(i_l - \delta \varepsilon_t) \quad (5)$$

where  $A \equiv \frac{[(\kappa+\delta)(\kappa^2+\lambda)+\kappa^2\beta\delta]\delta}{(\kappa^2+\lambda)[(\kappa+\delta)^2+\beta\delta^2]+[2(\kappa+\delta)+\beta\delta]\kappa^2\beta\delta} \in (0, 1)$ .

The monetary authority stimulates the economy in  $t$ , through the expectations channel, by promising a future policy rate below the value that is expected under discretion (i.e.  $E_t i_{t+1}^{DLB} = \delta \bar{\varepsilon}_{t+1}$ ). The difference between the expected rate and the promised one is increasing in the difference of the lower-bound rate with respect to the optimal rate for period  $t$ . Also notice that the promised rate decreases with the size of the recessionary shock.

By providing FG, the central bank mitigates the loss of period  $t$  by reducing monetary policy flexibility in  $t+1$ , and therefore at the cost of increasing the expected loss of that period. As a result, FG may not be preferable to discretion in every case. To know the conditions under which FG is preferred, we compare the expected loss for both cases. Using equations (1)–(3) and (5), after some algebra it can be seen that  $L_t^{FG} + \beta E_t L_{t+1}^{FG}$  is equal to

$$\sigma_{\varepsilon, t+1}^2 \beta (\kappa^2 + \lambda) + \frac{[(\kappa^2 + \lambda)^2 + \kappa^2 \beta \lambda] \beta (i_l - \delta \varepsilon_t)^2}{(\kappa^2 + \lambda)[(\kappa + \delta)^2 + \beta \delta^2] + [2(\kappa + \delta) + \beta \delta] \kappa^2 \beta \delta} \quad (6)$$

where  $\sigma_{\varepsilon, t+1}$  is the standard deviation of  $\varepsilon_{t+1}$ . Then, by comparing the foregoing equation with equation (4), we find that when the lower-bound problem is faced (i.e.  $\varepsilon_t < \frac{i_l}{\delta}$ ), FG is preferred over discretion iff

$$\varepsilon_t < \frac{i_l - \sqrt{\phi}}{\delta} \quad (7)$$

where  $\phi \equiv \sigma_{\varepsilon, t+1}^2 \beta (\kappa^2 + \lambda) \delta^2 \frac{(\kappa^2 + \lambda)[(\kappa + \delta)^2 + \beta \delta^2] + [2(\kappa + \delta) + \beta \delta] \kappa^2 \beta \delta}{[(\kappa + \delta)(\kappa^2 + \lambda) + \kappa^2 \beta \delta]^2}$ .

*When the size of the (negative) demand shock is large enough, the central bank finds it better to make a promise about the upcoming interest rate.*

### 2.3 The credibility problem

In the previous analysis we have assumed that the central bank's promise is fully credible. Nonetheless, it is not difficult to illustrate why an announcement about the future interest



rate, as described above, faces a credibility problem. The benefits of FG come, in  $t$ , as a result of the effect of the announcement on the economy through the expectations channel while the cost is assumed in  $t + 1$  when instead of setting an optimal interest rate the central bank has to stick to the promised one. Since the benefits are already realised in  $t$ , what are the incentives in  $t + 1$  for the monetary authority to live up to its promise? In this case there is a problem of time inconsistency, as described by Kydland & Prescott (1977): rational economic agents anticipate the central bank's incentives to renege on its promise and, accordingly, do not believe the announcement.

Lack of credibility makes FG useless as a monetary policy tool. However, the economic literature has also proposed possible solutions to the time inconsistency problem. Since it is not our intention to find an alternative solution to this problem, for the rest of the paper we simply assume that a solution is possible, without modelling it explicitly. For instance, the central bank may face again a lower-bound situation in the future, and hence it has incentives to keep its reputation today. In the next section, under the assumption of full credibility, we study the possibility that the announcement makes explicit the conditions under which the central bank will deviate from the promised interest rate.

### **3 FG with an escape clause**

Recently, some major central banks have started to provide 'state-contingent' guidance i.e. forward guidance with an escape clause. For instance, in December 2012, the FOMC stated that an exceptionally low policy rate would be appropriate as long as the unemployment rate remained above 6.5% and the inflation forecast (between one and two years ahead) was no more than 0.5% above the long-term target (2%). Similarly, in August 2013, the Monetary Policy Committee of the Bank of England publicly agreed on not raising the Bank Rate (from a level of 0.5%) at least until the unemployment rate fell to 7% (provided that inflation expectations remained well anchored and there was no significant threat to financial stability). Taking into consideration this trend, we intend to contribute by incorporating an escape clause to the formal analysis of FG.

As mentioned above, we assume that in period  $t$  there is a negative and large demand shock such that the interest-rate lower bound is reached and that the economic recovery is expected

in  $t + 1$  ( $E_t \varepsilon_{t+1} \equiv \bar{\varepsilon}_{t+1} > 0$ ). If the demand shock  $\varepsilon_{t+1}$  is positive and large, the central bank faces a high cost of fulfilling its promise because there will be a significant deviation of the announced interest rate from the optimal one. As a consequence, the central bank might find it useful to make explicit a condition under which it will renege on commitment to the announced interest rate and will set such rate in a discretionary manner. Formally, in period  $t$ , the central bank announces  $\theta_{t+1}$  with an escape clause: if the demand shock in  $t + 1$  exceeds a threshold (i.e.  $\varepsilon_{t+1} > \varepsilon_h$ ), the interest rate will be set as in the discretionary case,  $i_{t+1}^* = \delta \varepsilon_{t+1}$ .

The monetary policymaker picks both the announced interest rate and the threshold so as to minimise

$$L_t(i_l, \theta_{t+1}) + \beta \int_0^{\varepsilon_h} f(\varepsilon_{t+1}) L_{t+1}(\theta_{t+1}, \varepsilon_{t+1}) d\varepsilon_{t+1} \quad (8)$$

where  $f(\cdot)$  corresponds to the pdf of  $\varepsilon_{t+1}$  and we have taken into account that when the interest rate is set at its optimal level  $i_{t+1}^*$ , the loss of period  $t + 1$  is zero, i.e.,  $L_{t+1}(i_{t+1}^*) = 0$ . We have also made explicit that, in addition to  $i_l$ , the announced rate  $\theta_{t+1}$  affects the economy in  $t$  (via expectations<sup>7</sup>). It also affects the economy in  $t + 1$  as long as the demand shock does not exceed the threshold.

This problem is solved numerically for a set of benchmark parameter values, taken from Bodenstein et al. (2012). The discount factor is set to  $\beta = 0.9913$ . The parameter in the IS curve (related to the intertemporal elasticity of substitution of households) is set to  $\delta = 0.16$ . The coefficient  $\kappa$  in the Phillips curve is equal to 0.024. The weight on output stabilization,  $\lambda$ , is equal to 0.003.<sup>8</sup> The value of  $i_l$ , the interest-rate lower bound, is set to  $-5.2\%$ , the negative of the average of the federal funds rate for the period 1955–2013 (remember that the variables in our model are expressed as deviations from the steady state). We assume

---

<sup>7</sup>Notice that  $E_t \pi_{t+1} = \kappa E_t y_{t+1}$  and  $E_t y_{t+1} = -\frac{1}{\delta} \theta_{t+1} F(\varepsilon_h) + \int_0^{\varepsilon_h} \varepsilon_{t+1} f(\varepsilon_{t+1}) d\varepsilon_{t+1}$  where  $F(\cdot)$  corresponds to the cdf of  $\varepsilon_{t+1}$ .

<sup>8</sup>Following the structure of the standard New Keynesian model, the parameter  $\kappa$  is equal to  $\left[ \frac{(1-\omega)(1-\beta\omega)}{\omega} \right] \left[ \frac{\delta+\varphi}{1+\varphi\mu} \right]$  and  $\lambda = \frac{\kappa}{\mu}$  where  $\omega$  (0.66),  $\mu$  (7.66) and  $\varphi$  (0.47) are underlying structural parameters representing, respectively, the probability that the firm cannot adjust its price (under Calvo pricing), the elasticity of substitution between goods and the elasticity of the real marginal cost with respect to the output level.

$\varepsilon_t$  is normally distributed with zero mean and its standard deviation ( $\sigma_{\varepsilon,t}$ ) is endogenously determined to be consistent with a probability of hitting the ZLB equal to 5.5%.<sup>9, 10</sup> Since the economic recovery is expected in  $t + 1$ , the distribution for  $\varepsilon_{t+1}$  is truncated on  $\mathbb{R}^+$ .<sup>11</sup>

Table 1 shows the optimal values of  $\theta_{t+1}$  and  $\varepsilon_h$  for different values of  $\varepsilon_t$  between  $-0.33$ , slightly below  $-0.325$ , that is, the maximum value for the shock such that the central bank still faces a lower bound situation, and  $-0.63$ , such that the probability of a lower shock is just 0.1% (we denote by  $G(\cdot)$  the cdf of  $\varepsilon_t$ ). Table 1 also shows the expected value of the interest rate that would be set under discretion when facing shocks below the threshold (i.e.  $\tilde{E}_t i_{t+1}^* \equiv E_t [\delta \varepsilon_{t+1} | \varepsilon_{t+1} \leq \varepsilon_h]$ ) and the loss reduction of FG with an escape clause (henceforth “FGEC”) with respect to discretion under ZLB ( $\Delta L$ ).

Table 1: Optimal values of  $\theta_{t+1}$  and  $\varepsilon_h$

$\varepsilon_t$	$G(\varepsilon_t)$ (%)	$\theta_{t+1}$ (%)	$\varepsilon_h$	$F(\varepsilon_h)$ (%)	$\tilde{E}_t i_{t+1}^*$ (%)	$\Delta L$ (%)
-0.33	5.23	-0.001	0.012	4.7	0.10	5.2
-0.38	3.08	-0.023	0.088	33.5	0.69	28.6
-0.43	1.72	-0.084	0.138	50.3	1.06	37.8
-0.48	0.91	-0.177	0.179	62.1	1.34	43.2
-0.53	0.46	-0.301	0.215	71.0	1.57	46.7
-0.58	0.22	-0.459	0.247	77.5	1.75	49.3
-0.63	0.10	-0.641	0.277	82.7	1.90	51.2

From equation (7) and for the baseline parameters, FG without an escape clause (i.e. an unconditional promise) is preferred over discretion on the condition that  $\varepsilon_t < -0.482$ , that is, only in 0.89% of cases or, equivalently, in 16% of the ZLB events. If we introduce an

<sup>9</sup>This probability is taken from Fernandez-Villaverde et al. (2012). Gavin et al. (2013) estimate the probability of hitting the ZLB for different Taylor-type rules (they allow for variation of the weights on inflation and output) and find values between 1.5% and 8.4%.

<sup>10</sup>The probability of hitting the ZLB is very sensitive to the combination of values set to  $i_l$ ,  $\delta$  and to  $\sigma_{\varepsilon,t}$ , such that a small change to one of these parameters may lead to an economy that virtually never hits the ZLB or, on the contrary, that is permanently experiencing such situation. For the values set to  $\delta$  (0.16) and  $i_l$  (-5.2%), the consistent value of  $\sigma_{\varepsilon,t}$  is 0.2034.

<sup>11</sup>It can be verified that  $\bar{\varepsilon}_{t+1} = 0.1623$  and  $\sigma_{\varepsilon,t+1} = 0.1226$ .

escape clause, FGEC is better than discretion for all ZLB events ( $\varepsilon_t < -0.325$ ). From the last column, notice that the loss reduction of FGEC with respect to discretion is increasing in the size of the shock (i.e. a severe ZLB situation makes FGEC more beneficial, relative to discretion).

The greater the size of the recessionary shock (column 1) the lower the optimal promised rate (column 3) and the higher the optimal threshold (column 4), and therefore the higher the probability of delivering the announced rate (column 5). Also notice that for a shock equal to  $-0.63$  (a lower shock occurs with probability 0.1%), the optimal threshold implies a probability of delivering the promised rate of 82.7%, and hence even for very large recessionary shocks it is not optimal to make unconditional promises.<sup>12</sup>

Also notice that the promised interest rate (column 3) is lower than the one that would be expected under discretion when facing shocks below the threshold, that is,  $\tilde{E}_t i_{t+1}^*$  (column 6). As remarked above, a credible promise of delivering a lower-than-expected interest rate in  $t+1$  stimulates the economy in  $t$  through the effect on expectations. Nevertheless, announcing an escape clause implies that, with some probability, the announced rate may not be delivered, and hence the benefits of FG are reduced. If the demand shock in  $t$  is negative and large, the lower-bound problem imposes high costs on society and, consequently, the benefits of stimulating the economy by providing FG are large as well. This is why the central bank is willing to deliver the announced interest rate,  $\theta_{t+1}$ , with high probability. In this case, since the probability of facing a shock higher than the announced threshold is very low, the cost of the escape clause is small and keeping flexibility is attractive only for extreme cases: if a very large and positive shock  $\varepsilon_{t+1}$  occurs, such clause allows the central bank to avoid the cost of a significant deviation from the optimal policy rate. If, instead, the demand shock in  $t$  is negative but not very large, the benefits of sticking to the promised rate are relatively small, and hence the optimal escape clause implies a low probability of delivering it because the benefits of flexibility are significant.

We have also checked how our results are affected when some underlying structural parameters (see footnote 8) change. When we allow for variation of the elasticity of substitution between goods and the elasticity of the real marginal cost with respect to output ( $\mu \in [5.66, 9.66]$ )

---

<sup>12</sup>Strictly speaking, no promise is unconditional unless  $\varepsilon_h \rightarrow \infty$ ; however, for practical purposes one could treat as "unconditional" a promise that implies a fulfilment probability higher than 95%.

and  $\varphi \in [0.35, 0.59]$ , respectively), there is no significant impact on our results. Our qualitative results (and hence our main conclusions) are robust as well to changes to the probability that the firm cannot adjust its price ( $\omega \in [0.5, 0.8]$ ); however, variations in this parameter produce more significant changes in the quantitative results. In particular, we find that the loss reduction of FGEC with respect to discretion (for a given value of the demand shock) is decreasing in the price–rigidity level, i.e. decreasing in  $\omega$ .<sup>13</sup>

## 4 Conclusion

The present paper analyses forward guidance (FG) with an escape clause, that is, when the central bank promises a future policy rate but also announces the conditions under which it will not deliver the promised rate. To this purpose we set up a two–period New Keynesian model. In the first period a large and negative demand shock occurs such that the central bank is subject to the zero lower bound (ZLB) constraint. In the second period the economy recovers.

While FG with an escape clause (FGEC) is better than discretion to respond to any zero–lower bound (ZLB) situation, unconditional FG performs better than discretion only in the most extreme 16% of ZLB events. With regard to FGEC we find that the greater the size of the recessionary shock the lower the optimal promised rate and the higher the optimal threshold, and hence the higher the probability of delivering the promised rate. Even for very large recessionary shocks it is not optimal to make unconditional promises.

---

<sup>13</sup>For illustration purposes we present some results for different values of  $\omega$  in the appendix.

## Appendix

Table A1: Results for different values of  $\omega$

$\varepsilon_t$	$G(\varepsilon_t)$ (%)	$\theta_{t+1}$ (%)	$\varepsilon_h$	$F(\varepsilon_h)$ (%)	$\tilde{E}_t i_{t+1}^*$ (%)	$\Delta L$ (%)
<b><math>\omega = 0.55</math></b>						
-0.33	5.23	0.000	0.014	5.5	0.11	8.7
-0.43	1.72	-0.080	0.137	49.9	1.06	47.0
-0.53	0.46	-0.283	0.208	69.4	1.52	55.4
-0.63	0.10	-0.571	0.267	81.1	1.85	59.5
<b><math>\omega = 0.60</math></b>						
-0.33	5.23	0.000	0.013	5.1	0.10	6.8
-0.43	1.72	-0.080	0.138	50.3	1.06	42.5
-0.53	0.46	-0.289	0.212	70.3	1.55	51.2
-0.63	0.10	-0.607	0.272	81.9	1.87	55.5
<b><math>\omega = 0.70</math></b>						
-0.33	5.23	0.000	0.012	4.5	0.09	4.5
-0.43	1.72	-0.083	0.138	50.3	1.06	35.2
-0.53	0.46	-0.311	0.216	71.2	1.57	44.2
-0.63	0.10	-0.657	0.280	83.1	1.91	48.7
<b><math>\omega = 0.75</math></b>						
-0.33	5.23	0.000	0.011	4.3	0.09	3.7
-0.43	1.72	-0.080	0.138	50.3	1.06	32.4
-0.53	0.46	-0.319	0.217	71.4	1.58	41.4
-0.63	0.10	-0.673	0.283	83.6	1.93	46.1

## References

- Bank of England. (2013a). *Quarterly inflation report Q&A*. Retrieved from <http://www.bankofengland.co.uk/publications/Documents/inflationreport/2013/conf070813.pdf>
- Bank of England. (2013b). *Monetary policy trade-offs and forward guidance*. Retrieved from <http://www.bankofengland.co.uk/publications/Documents/inflationreport/2013/ir13augforwardguidance.pdf>
- Bank of England. (2013c). *Global aspects of unconventional monetary policies* (speech). Retrieved from <http://www.bankofengland.co.uk/publications/Documents/speeches/2013/speech674.pdf>
- Bank of England. (2013d). *Monetary policy and forward guidance in the UK* [speech]. Retrieved from <http://www.bankofengland.co.uk/publications/Documents/speeches/2013/speech681.pdf>
- Bodenstein, M., Hebden, J., & Nunes, R. (2012). Imperfect credibility and the zero lower bound. *Journal of Monetary Economics*, 59(2), 135–149.
- Campbell, J., Evans, C. L., Fisher, J. D. M., & Justiniano, A. (2012). *Macroeconomic Effects of FOMC Forward Guidance*. Brookings Papers on Economic Activity, The Brookings Institution.
- Eggertsson, G. B., & Woodford, M. (2003). *The Zero Bound on Interest Rates and Optimal Monetary Policy*. Brookings Papers on Economic Activity, Economic Studies Program, The Brookings Institution, vol. 34(1), pages 139–235.
- Femia, K., Friedman, S., & Sack, B. (2013). *The effects of policy guidance on perceptions of the fed's reaction function*. (Staff Report No. 652) Staff Reports, Federal Reserve Bank of New York.
- Fernandez-Villaverde, J., Gordon, G., Guerron-Quintana, P. A., & Rubio-Ramirez, J. F. (2012). *Nonlinear adventures at the zero lower bound*. (Working paper 2-10) Working papers, Federal Reserve Bank of Philadelphia.

- Floro, D., & Tesfaselassie, M. (2013). *Can forward guidance be ambiguous yet effective?* Kiel Policy Brief, IfW, No. 65.
- Gavin, W. T., Keen, B. D., Richter, A. W., & Throckmorton, N. A. (2013). *Global dynamics at the zero lower bound.* (Working paper no. 2013–007), Working papers, Federal Reserve Bank of St. Louis.
- Gersbach, H., & Volker, H. (2008). *Forward Guidance for Monetary Policy: Is It Desirable?* Working paper No. 08/64, CER–ETH Economics working paper series, Center of Economic Research (CER–ETH) at ETH Zurich.
- Gürkaynak, R. S., Sack, B., & Swanson, E. T. (2005). Do actions speak louder than words? the response of asset prices to monetary policy actions and statements. *International Journal of Central Banking*, 1(1), 55–93.
- Kool, C. J., Middeldorp, M., & Rosenkranz, S. (2011). Central bank transparency and the crowding out of private information in financial markets. *Journal of Money, Credit and Banking*, 43(4), 765–774.
- Kool, C. J., & Thornton, D. L. (2012). *How effective is central bank forward guidance?* (Working Paper 2012-063A) Working Paper Series, Research Division, Federal Reserve Bank of St. Louis.
- Kydland, F. E., & Prescott, E. C. (1977). Rules rather than discretion: The inconsistency of optimal plans. *The Journal of Political Economy*, 85(3), 473–492.
- Levin, A., Lopez-Salido, D., Nelson, E., & Yun, Y. (2010). Limitations on the effectiveness of forward guidance at the zero lower bound. *International Journal of Central Banking*, 6(1), 143–189.
- Raskin, M. D. (2013). *The effects of the federal reserve’s date-based forward guidance.* Finance and Economics Discussion Series, Divisions of Research & Statistics and Monetary Affairs, Federal Reserve Board, Washington D.C.
- Woodford, M. (2012). Methods of Policy Accommodation at the Interest–Rate Lower Bound. *Proceedings– Economic Policy Symposium– Jackson Hole*, 185–288.